

REMARKS

The Final Office Action mailed September 6, 2006, has been received and reviewed.

Claims 1 through 16 and 19 are currently pending in the application. Claims 1 through 16 and 19 stand rejected. Applicants respectfully request reconsideration of the claims 1 through 16 and 19 in view of the remarks presented herein.

35 U.S.C. § 103(a) Obviousness Rejections

Obviousness Rejection Based on U.S. Patent No. 5,677,566 to King et al. in view of U.S. Publication No. 2001/0011773 to Havens et al.

Claims 1, 2, 5 through 9, 13 through 16, and 19 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over King et al. (U.S. Patent No. 5,677,566) in view of Havens et al. (U.S. Publication No. 2001/0011773). Applicants respectfully traverse this rejection, as hereinafter set forth.

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (Emphasis added).

Applicants respectfully reassert that claims 1, 2, 5 through 9, 13 through 16, and 19 could not have been obvious to a person of ordinary skill in the art at the time the invention was made considering King et al. in view of Havens et al. because King et al. and Havens et al., when combined and considered as a whole, do not teach or suggest an intermediate structure comprising "at least one carrier bond ... [attached to or disposed on] the upper surface of [a] conductive lead frame member," and "wherein the intermediate structure is free of an encapsulant material to be subsequently applied to the intermediate structure," as recited in each

of independent claims 1 and 2, and because there is no motivation to combine the teachings of King et al. with the teachings of Haven et al. in the manner proposed by the Examiner.

Applicants admit that King et al. teaches a final chip-scale package substantially similar to the final chip-scale package taught in the application for the present invention. Applicants and the Examiner appear to agree, however, that King et al. does not teach or suggest a method of manufacturing a chip-scale package in which the carrier bonds are attached to the conductive leads prior to encapsulation, as taught in the application for the present invention. As such, Applicants and the Examiner further appear to agree that King et al. does not teach or suggest an intermediate structure as claimed in either of independent claims 1 and 2, in which at least one carrier bond is directly attached to the upper surface of at least one conductive lead frame member of the intermediate structure, and the intermediate structure is free of an encapsulant material.

The Examiner has asserted that although King et al. does not teach such as intermediate structure, one of ordinary skill in the art, considering King et al. in view of Havens et al., would have been motivated to combine the teachings of Havens et al. with the teachings of King et al. in such a way as to provide an intermediate structure as recited in either of independent claims 1 and 2. Applicants respectfully disagree for the reasons set forth below.

Havens et al. teaches a hydrophobic hermetic covering that can be applied to substantially all external surfaces of an electronic package, and methods of applying the hydrophobic hermetic covering to external surfaces of an electronic package. Havens et al. teaches that the hermetic covering may comprise a thin layer (e.g., 0.001 inches) of Teflon® material or another fluorinated thermoset material. *Havens et al.*, Page 3, Paragraphs [0031], [0033], [0037].

Havens et al. teaches that the hydrophobic hermetic covering can be applied to an electronic package either before (*See e.g., Id.*, Page 2, Paragraph [0028] – Page 3, Paragraph [0031]) or after (*See Id.*, Page 5, Paragraphs [0057]-[0058]) attaching carrier bonds (e.g., solder balls 6) to a substrate 3 of an electronic package 1 to which the hydrophobic hermetic covering is applied.

Applicants admit that one of ordinary skill in the art, considering the combined teachings of King et al. and Havens et al. as a whole at the time the present invention was made, may have

been motivated to replace the encapsulating material 26 of the device taught by King et al. (*See e.g.*, King et al., column 3, lines 28-33) with a hermetic covering as taught in Havens et al. to address the moisture sensitivity problem addressed by Havens et al. (*See e.g.*, Havens et al., Page 2, Paragraph [0025]). Applicants respectfully assert, however, that in doing so, one of ordinary skill in the art would have been motivated to apply the hermetic covering before attaching the carrier bonds to the conductive leads of the device taught by King et al., and not after.

King et al. teaches applying the encapsulating material before attaching the carrier bonds (external electrodes 28). Havens et al. also teaches that the hermetic covering can be applied before attaching the carrier bonds (solder balls 6). As a result, this method is in accordance with both the teachings of King et al. and Havens et al., and as such, clearly would have been the obvious method of choice to one of ordinary skill in the art at the time the present invention was made. While Havens et al. teaches that the hermetic covering may be applied either before or after attaching the carrier bonds 6 to the electronic package 1, there is no reason one of ordinary skill in the art would be motivated to further and unnecessarily modify the teachings of King et al. so as to attach the carrier bonds before applying the hermetic covering. In other words, the prior art references do not teach or suggest the desirability of attaching the carrier bonds before applying the hermetic covering as opposed to attaching the carrier bonds after applying the hermetic covering.

The Examiner has asserted at Pages 6-7 of the outstanding Office Action, that “[a]t the very least Havens discloses [0026] that in one embodiment, all of the package, including all external conductor surfaces, are covered (e.g., to facilitate shipment),” and that as a result, “[o]ne of ordinary skill in the art would be motivated to improve King by using the inventive structure of Havens to improve the reliability and product yield or facilitate shipment.” Applicants respectfully assert that there is no evidence that methods in which the carrier bonds are attached prior to applying the hermetic covering taught by Havens et al. would result in higher reliability and product yield than methods in which the carrier bonds are attached after applying the hermetic covering. Furthermore, Applicants respectfully assert that one of ordinary skill in the art would recognize that, in methods in which the hermetic covering taught by Havens et al. is applied prior to attaching the carrier bonds, the electronic package could be shipped prior to

attaching the carrier bonds, in which case all of the package, including all of the external surfaces, would be covered by the hermetic covering, thereby facilitating shipment in the manner taught by Havens et al.

In sum, there is no teaching or suggestion in the cited prior art references that any benefit would be achieved by attaching the carrier bonds to the conductive leads of the device taught by King et al. prior to applying the hermetic covering taught by Havens et al. In other words, the prior art references do not teach or suggest any desirability for attaching the carrier bonds to the conductive leads before applying the hermetic covering instead of after applying the hermetic covering. In contrast, however, applying the hermetic covering taught by Havens et al. prior to attaching the carrier bonds to the conductive leads of the device taught by King et al. accords with the teachings of both Havens et al. and King et al. and would require less modification of the teachings of King et al. Therefore, one of ordinary skill in the art, considering the teachings of King et al. and Havens et al. in combination and as a whole at the time the present invention was made, clearly would have been motivated to apply the hermetic covering taught by Havens et al. to the device taught by King et al. before attaching the carrier bonds to the leads of the device, as this would require less modification of the teachings of King et al.

Applicants respectfully assert that the Examiner appears to be considering the cited prior art references using improper hindsight and in view of the Applicants disclosure in the present application.

For each of the reasons discussed above, Applicants respectfully assert that independent claims 1 and 2 could not have been obvious to a person of ordinary skill in the art at the time the present invention was made considering King et al. in view of Havens et al., and request that the Examiner withdraw the rejection of independent claims 1 and 2 under 35 U.S.C. § 103(a).

Furthermore, the non-obviousness of independent claim 2 precludes a rejection of claims 5 through 9, 13 through 16, and 19, which depend from claim 2, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), see also MPEP § 2143.03.* At least for this reason, Applicants request that the Examiner withdraw the 35 U.S.C. § 103(a) obviousness rejection to claims 5 through 9, 13 through 16, and 19, in addition to the rejection to independent claim 2.

Regarding dependent claim 14, Applicants respectfully assert that the teachings of King et al., considered together with the teachings of Havens et al., do not teach or suggest carrier bonds that comprise a conductive or conductor-filled polymer, as recited therein. Therefore, Applicants respectfully assert that dependent claim 14 could not have been obvious to a person of ordinary skill in the art at the time the invention was made considering King et al. in view of Havens et al., and request that the Examiner withdraw the rejection of dependent claim 14 under 35 U.S.C. § 103(a) for this additional reason.

Obviousness Rejection Based on U.S. Patent No. 5,677,566 to King et al. in view of U.S. Publication No. 2001/0011773 to Havens et al., as applied to claims 2 and 9 above, and further in view of U.S. Patent No. 5,894,107 to Lee et al.

Claims 3, 4, and 10 through 12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over King et al. (U.S. Patent No. 5,677,566) in view of Havens et al. (U.S. Publication No. 2001/0011773), as applied to claims 2 and 9 above, and further in view of Lee et al. (U.S. Patent No. 5,894,107). Applicants respectfully traverse this rejection, as hereinafter set forth.

Each of claims 3, 4, and 10 through 12 depends either directly or indirectly from independent claim 2, and as a result, each includes the limitations recited in independent claim 2.

Applicants assert that none of claims 3, 4, and 10 through 12 could have been obvious under 35 U.S.C. § 103(a) at the time the inventions were made because King et al., Havens et al., and Lee et al. when combined and considered as a whole, do not teach or suggest an intermediate structure comprising “at least one carrier bond . . . [attached to or disposed on] the upper surface of [a] conductive lead frame member,” and “wherein the intermediate structure is free of an encapsulant material to be subsequently applied to the intermediate structure,” as recited in independent claim 2, and because there is no motivation to combine the teachings of King et al. with the teachings of Haven et al. in the manner proposed by the Examiner, as previously discussed herein.

As previously discussed, King et al. and Havens et al., when combined, do not teach or suggest an intermediate structure as recited in independent claim 2. The teachings of Lee et al. do not satisfy the deficiencies.

Lee et al. teaches encapsulating a chip and lead frame assembly and *subsequently* providing a plurality of carrier bonds in the form of solder balls 16 on exposed upper surfaces of external connection means 34. *Lee et al.*, column 5, lines 20-29, and 39-43; FIGS. 11-12. Therefore, considering the teachings of Lee et al. in combination with the teachings of King et al. and Havens et al., the prior art references relied upon by the Examiner do not teach or suggest an intermediate structure comprising “at least one carrier bond … [attached to or disposed on] the upper surface of [a] conductive lead frame member,” and “wherein the intermediate structure is free of an encapsulant material to be subsequently applied to the intermediate structure,” as recited in independent claim 2.

Furthermore, for the same reasons previously discussed herein, Applicants respectfully assert that there is no suggestion or motivation, either in the cited references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the teachings of King et al., or to combine the teachings of Havens et al. with those of King et al., in such a way as to provide the invention recited in independent claim 2, and hence, in any one of claims 2 through 4 and 10 through 12, which depend from claim 2.

For each of these reasons, Applicants respectfully assert that none of claims 3, 4, and 10 through 12 could have been obvious to a person of ordinary skill in the art at the time the invention was made considering King et al. in view of Havens et al., and further in view of Lee et al., and request that the Examiner withdraw the rejection of dependent claims 3, 4, and 10 through 12 under 35 U.S.C. § 103(a).

CONCLUSION

Claims 1 through 16 and 19 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicants' undersigned attorney.

Respectfully submitted,



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